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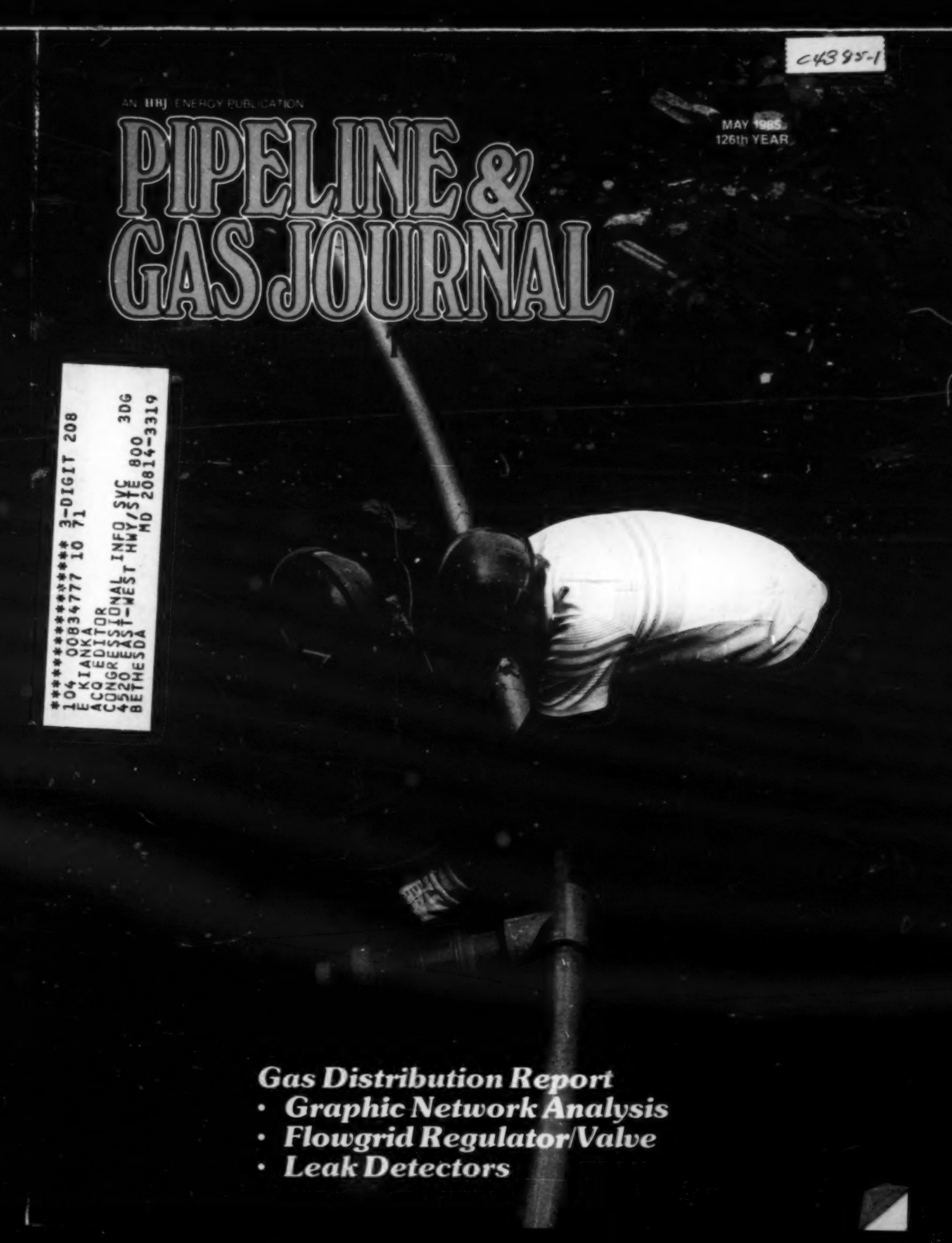

Gas Distribution Report

- Graphic Network Analysis
- Flowgrid Regulator/Valve
- Leak Detectors

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International Pipeline & Gas Utility Design, Construction & Operation

One of the most important advances in gas distribution over the last 20 years has been the introduction of plastic pipe into the marketplace. Here a crew from National Fuel Gas Corp. taps into a plastic line as part of a project to serve new home construction.

ON THE COVER

Gas is the premium fuel for many applications – including putting the fire into a movie star dragon. Feeding the dragon was causing woes at Universal Studios, until Southern California Gas stepped in and solved the problem.

IN THIS ISSUE

Pipelines are the safest, most efficient way to move liquid energy from the wellhead to the consumer. In the June issue the focus will be on changes coming in the marketplace. Articles will include an outlook for petroleum pipelines by Keith Bailey, chairman of Williams Pipe Line Co., and details of the All-American Pipeline project.

NEXT MONTH

1 **Newsreel**
Highlights of month's news

6 **Government Guidelines**
State and Federal regulatory hotline

8 **MCF**
Industry news/developments

10 **Projects**
New systems/expansions/developments

14 **Continental Energy Policy**
Development of a North American "Common Market" for energy could be the answer to economic, energy, and social problems in all three countries.

16 **GASNET**
Computer information system takes network and load information and converts it into information useful in many gas utility applications.

24 **The Flowgrid Valve**
New type of valve/regulator proves very effective in coping with rapid and severe flow changes in an industrial application.

30 **Flame Ionization Detectors**
Flame ionization has been the industry's standard in gas detection for almost 30 years, providing quality instruments with exceptional performance.

37 **Swedish Gas System**
By mid-1985, Swedish homes and factories will be receiving natural gas from Danish fields through a new pipeline system.

42 **A Perfect Pipelay**
The Fulmar Pipeline Project in the North Sea, which involves a whole range of new techniques, materials, and equipment, is a major first.

50 **Self-Adjusting Turbine Meters**
Increasing gas costs require extremely accurate gas measurements, regardless of swings in flow and changes in the weather.

54 **Gas-Fired Dragon**
Southern California Gas serves 4 million regular customers and one dragon. Today, even dragons can earn a better living with natural gas.

60 **Main On Bridge**
Coating protection and electrical continuity were two of the main concerns considered by UGI in installing a new main on a bridge over the Lehigh River.

62 **Bell Prover Care And Maintenance**
Certain steps are necessary to ensure the best possible accuracy that can be obtained from bell provers used in gas measurement applications.

64 **Portable Pipeline**
Not a customer was lost when gas service was cut off to three small Wisconsin towns thanks to a pipeline on wheels from Massachussetts.

65 **People**
Action makers on the move

68 **Products**
New materials/equipment/services

71 **Meetings**
Where it's happening

72 **Bookshelf**
Good reading ahead

74 **Ad Index**

Natural Gas Can Play Role In Developing Needed Continental Energy Policy

ENERGY ECONOMICS

by Dale W. Steffes,
Principal, Planning and Forecasting Consultants, Houston, Texas

In March 1985 President Reagan and Prime Minister Brian Mulroney met in Quebec City to open talks on a long-term bilateral trade and friendship policy between the U.S. and Canada. President Reagan is in his second and final term as the U.S. leader. Mulroney is just beginning his tenure as Canada's prime minister. From reading Mulroney's political philosophy as it came out in the recent campaign, it appears that Canada and the U.S. can compromise on several mutually beneficial issues. One could be a unified North American energy policy.

While Canada and the U.S. would be the likely benefactors, a true North American energy policy would include Mexico. The leadership of all three countries could be involved in developing a continental energy policy.

While this article is meant to mainly address energy policy, it must be considered in the bigger picture. There are many forces other than energy that must be addressed. These influences – social, technological, political, economic, ecological, and geographical – all impact each other, directly and indirectly.

The U.S. dominates the region in population, gross national product, and trade. In area, the Lower 48 plus Alaska equals Canada, but the continental U.S. lies in a more conducive climate. Certainly the U.S. is the most highly industrialized. Table 1 gives details on the general characteristics, population, area, GNP, GNP per capita, energy per capita, and trade of the three.

Mutual benefits. What could be gained by mutual cooperation between these three geographically connected nations? Each has something it could provide to the others without undue hardship. The trick will be to establish development that will make all parties better off by trading and working together. This is called "the law of comparative advantage" in economics, where every nation provides what it is best at producing.

Because of the relative geographical positions of the three countries in relation to each other, it makes sense to develop mutual relationships. It also would make sense to develop a common market, a common defense, a common money, a common aid agreement, and even some type of common government. All of this could be done while simultaneously protecting the political and social sovereignty of each country.

One place to begin implementing this set of common relationships would be a continental energy policy. Both Mexico and Canada are richly endowed with energy, just as the U.S. once was. The U.S. consumed much of its easy energy supply while developing into one of the world industrial powers. There could be considerable synergism if the U.S. could assist Canada and Mexico in developing their natural resources, using U.S. industrial and financial strengths. From Mexico's and Canada's parochial energy view, they could say that they do not need the U.S. industrial might. They are probably correct.

But if the U.S. is forced to develop a non-traditional energy economy, then when Mexico and Canada want to capitalize on their natural resource base, the U.S. would not be a market. We believe the energy economy eventually will transcend to a much higher level, as the industrialized world moves toward an information age.

Energy shift. It would be better for the continent to move slowly to a non-traditional energy economy by first consuming the available conventional resources. When the world physically depletes its conventional energy, energy prices will be high enough to justify new fuel technology, yet require less than 15% of our total GNP.

Energy abundance. The North American continent is well endowed with conventional energies – petroleum, natural gas, coal, hydroelectric, and uranium. Table 2 details reserves and cites energy consumption and production. It uses quadrillion Btus for comparison (one quad = $1 \times 10^{(15)}$). The continent is very

TABLE 1
Basic Continental Relationships

	U.S.A.	Mexico	Canada
Population, millions	231.5	73.1	24.6
Area, (000) Km^2	9,363	1,973	90,976
GNP, Billions, U.S.$ (1982)	3,009	171	289
GNP/Capita U.S.$ (1982)	13,161	2,270	11,140
Energy per Capita			
(000) Kg of oil equivalent	7,540	740	9,208
Total World Merchandise Trade (1982), U.S.$ (millions)			
Imports	254,884	55,091	15,042
Exports	212,255	68,499	21,006

Source: World Bank

TABLE 2
North American Continental Energy
(Quadrillion Btu)

Country	Crude Oil	Natural Gas	Nat. Gas. Liquids	Coal	Hydro	Uranium	Total
		RESERVES					
U.S.	162	201		5300			
Mexico & Canada	220	173		150			
		PRODUCTION (1985)					
U.S.	17	18	2	18	3	4	= 62
Mexico & Canada	9	4	1	1	4	1	= 19
							81
		CONSUMPTION (1985)					
U.S.	.....	(Total)	.....	70	.....		70
Mexico & Canada	.....	(Total)	.....	12	.....		12
							82

Source: P&FC World Energy Outlook '85

Gas pipeline under construction in Western Canada.

close to being self-sufficient. The U.S. will consume 70 quads and produce 62 quads in 1985. Mexico and Canada will consume 12 quads and produce 19 quads. The totals are about equal.

From data in Table 2, it is evident that Mexico and Canada will be able to continue exporting energy for many years. Canada will export hydroelectric power to the eastern U.S. Mexico will continue to export crude oil to the U.S. and other countries. Mexico and Canada also have more than a 40-year supply of natural gas. They have done only modest gas exploration so far.

Pipeline system. It appears that a continental gas pipeline system and policy would make sense. It would connect Western Canadian and Arctic gas with eastern Canada and U.S. industrial markets as well as West Coast markets. Eastern Canada offshore gas will need to be connected to eastern U.S. markets. The other logical continental pipeline connections would be through Central America, tying to the pipeline network in South Texas. This system, discussed for more than two decades, would extend into South America. Such grandiose pipeline plans will not develop without the markets and strength of the industrialized nation – the U.S.

The most prominent trade-off will be economic. Is the market reliable? Will any of the parties default on their part of the agreement? Will natural gas trade make inter-country trade more balanced or will it distort it further? Will the flow of construction dollars be fairly divided? Current U.S./Canada merchandise trade favors Canada by $12 billion. The U.S. imports $63 billion of Canadian goods per year and Canada imports $51 billion of goods from the U.S.

Mexico-U.S. trade is different. Mexico is burdened with a monumental debt of nearly $100 billion, much owed to the private U.S. banking system. Most of this debt was incurred in anticipation of ever-increasing oil production and expected oil price increases. But prices and demand dropped, causing a real shock to the bankers and the energy industry.

Pipeline benefits. The building of these gas pipelines would create needed employment in all three countries. After they are built, the required exploration and production would cause employment to continue into the future. If these energy developments should take place, it would stimulate a better economic climate in each country.

The technology of oil and gas exploration and production is well developed for both the arctic and the tropics, onshore and offshore. Pipelining of hydrocarbons in severe environments is technically feasible. But costs must be reduced. Cost is the main reason why the Alaska gas pipeline was not built.

Much of the high cost of pipelines today is due to self-imposed environmental requirements. Arctic natural gas pipelines could be installed for less than half previous estimates if a little reason were applied. Ecologically, today's big issue is acid rain. It affects the continental energy policy. U.S. and Canadian leaders have agreed to high level discussions to address this problem.

All must benefit. A fair and equitable continental energy policy can be devised so that all parties would benefit by participating on a long term basis. It must be designed to accommodate external changes in world energy, such as demand and supply, because they will change very often over the rest of this century.

Investment in fixed facilities with a pipeline system should probably incorporate both private and public capital. Canada's National Energy Board and Mexico's Pemex must be involved.

While a continental energy policy and plan will be difficult to accomplish, it makes sense. To accomplish it, an *ad hoc* working committee could be formed to include U.S., Canadian, and Mexican counterparts. These groups would hold conferences and dialogues to build a body of agreements and to discuss disagreements that need to be overcome. A working committee would include one representative from each country for each of seven prime influences – 21 delegates.

A continental energy plan could become the basis for a unified or overall trade and economic plan for the North American continent. **P&GJ**